









## 3.7 Urban Areas

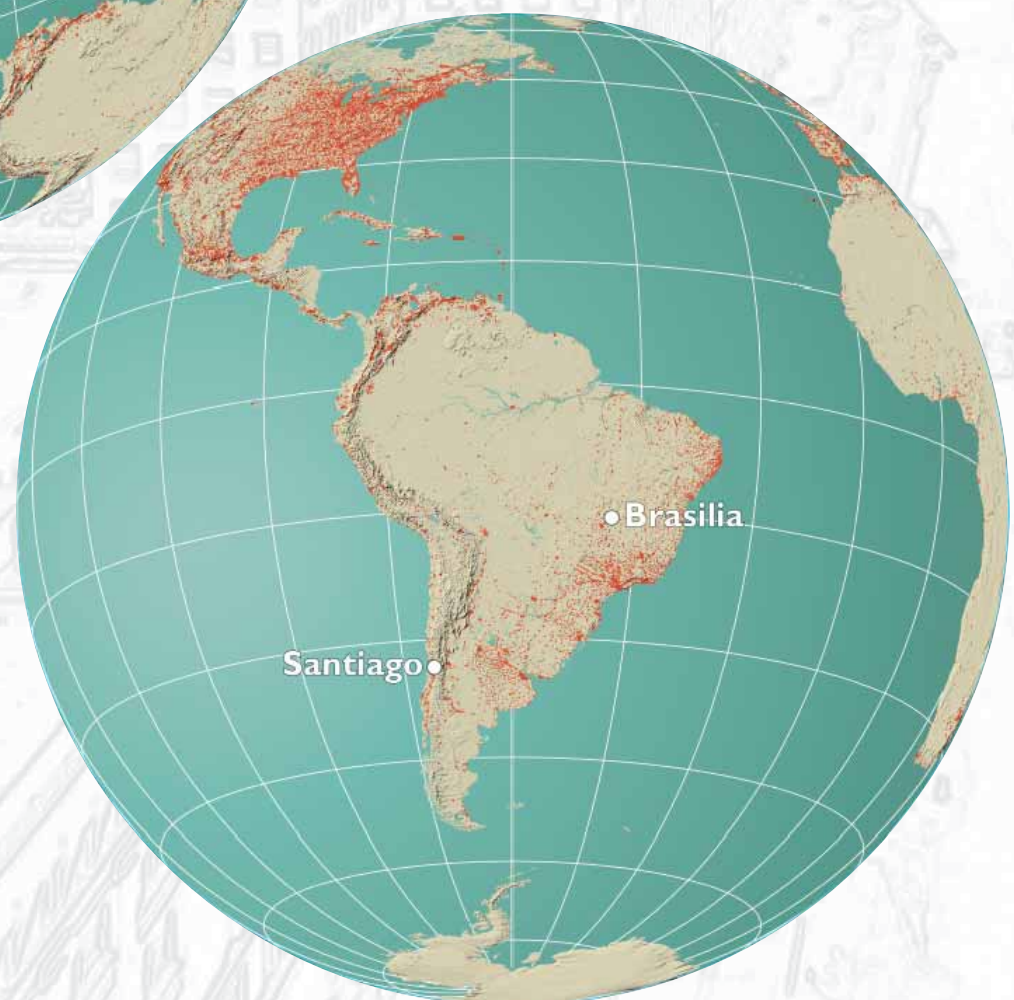
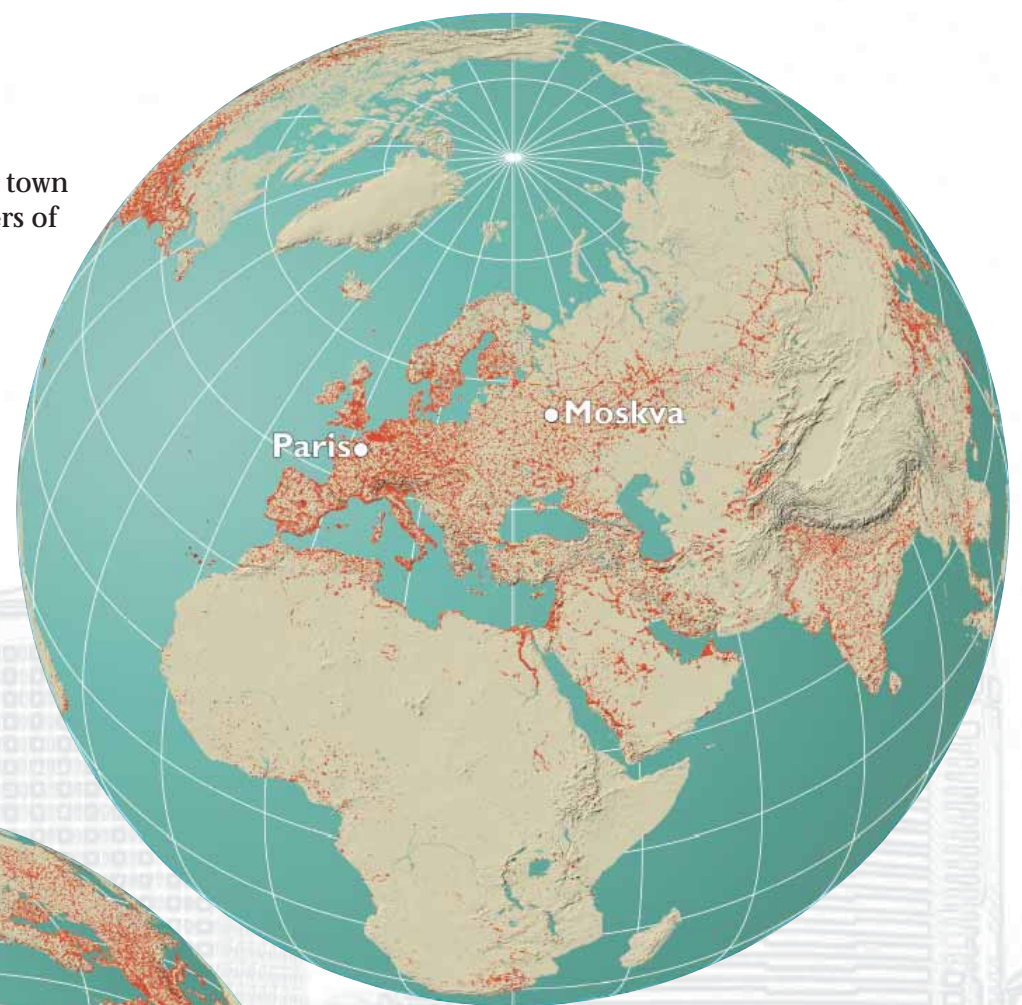
**A**n urban area is a geographical unit of land constituting a town or city. Urbanization is the process by which large numbers of people become permanently concentrated in relatively small areas to form towns or cities.

During the course of human history, urbanization has accelerated worldwide. Between 1975 and 2000, urban population increased from 1 500 million people to over 2 800 million, or about 45 per cent of the world's population (UNEP 2002b). By 2020, it is estimated that 60 per cent of the world's population will be urban (Anon 2003).

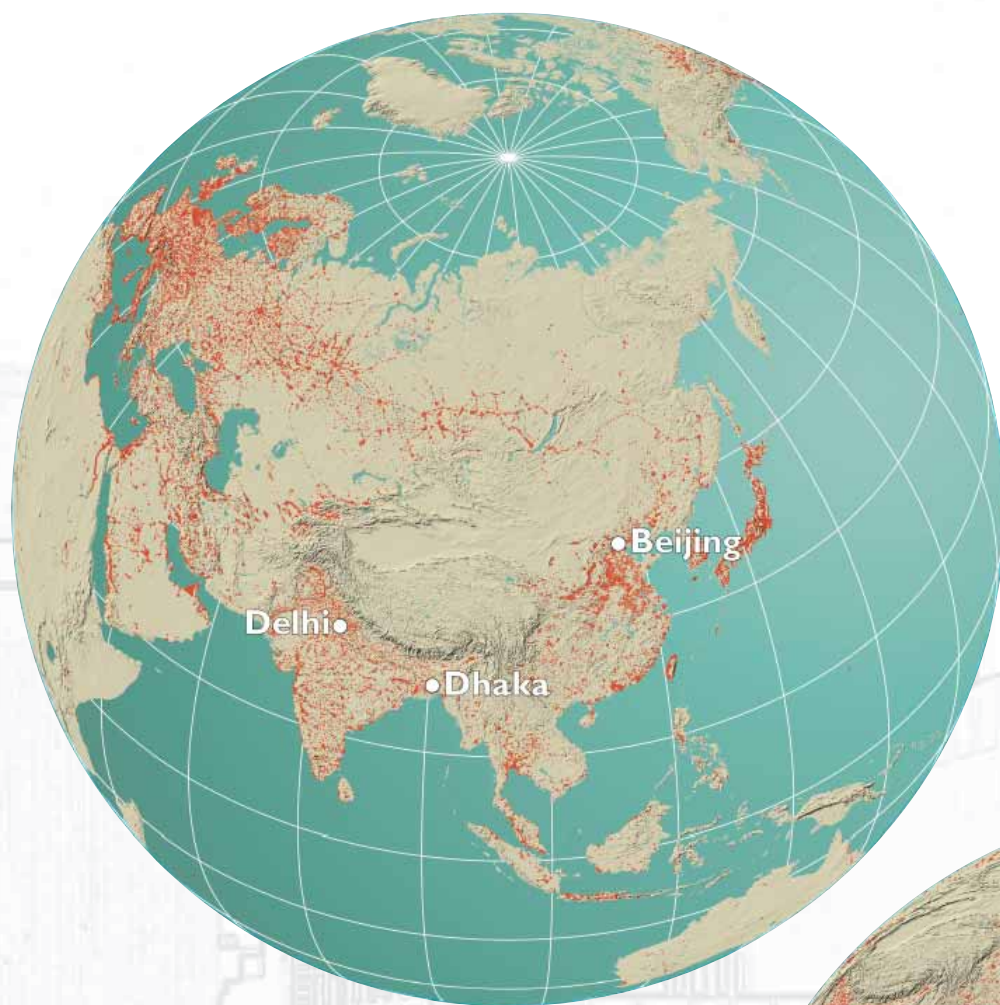
For many people, urban living represents a better lifestyle. On average, individuals living in urban areas have higher incomes and live healthier, easier lives than their rural counterparts. They have greater access to clean water and sanitation than those in rural areas. Concentrations of people also tend to strengthen infrastructures by consolidating transportation services, utilities, and roads.

It is also true that not all urban dwellers benefit from urban living. In 2001, 924 million people, or roughly 31.6 per cent of the global urban population, lived in slums (UN Habitat n.d.). A slum household is one in which a group of individuals living under the same roof lack one or more fundamental necessities, including access to clean water, access to sanitation, secure tenure, durability of housing, and sufficient living area (Warah 2003). In the next thirty years, as many as 2 000 million people will be living in urban slums unless substantial policy changes are put into place.

Wherever people are concentrated in large numbers, as they are in urban areas, the risk of disease and other health concerns have the potential to become extremely urgent issues. Overcrowding fosters epidemics of tuberculosis, influenza, and many other communicable diseases (Myers and Kent 1995). Urban areas also tend to be polluted. According to some estimates, industrialized countries exhaust 3 146 kg (6 936 lbs) of fossil fuels and produce 200 kg (440 lbs) of air pollutants every year. Fossil fuel use adds both pollutants and greenhouse gases to the atmosphere, the latter of which contribute to global warming. Temperatures in heavily urbanized areas may be 0.6-1.3°C (1.1-2.3°F) warmer than







Urban areas / artificial surfaces

Source: Global land cover 2000 (GLC 2000)



in rural areas. Higher temperatures, in turn, make cities incubators for smog (WRI 2000).

Urban populations are growing rapidly worldwide. As urban areas expand, they often encroach into agricultural lands. Urban expansion into agricultural areas in developing countries results in the conversion of nearly 500 000 hectares (1 235 526 acres) of arable land annually. However, urban and developed areas currently cover only about two to four per cent of the Earth's land surface (Wiebe 2003). As a result, some researchers argue that land lost to urbanization will not threaten global food production in the foreseeable future (Rosegrant et al. 2001). Nevertheless, urban expansion frequently takes prime agricultural land out of production, making it increasingly necessary to use marginal lands for cropland and pastures.

Perhaps the greatest impact of urbanization is on the environment. Cities use some 75 per cent of the world's resources and discharge similar amounts of waste, negatively impacting the health of local and global environments (Giradet 1995). By the end of the 1990s, people in developed countries produced from 300-800 kg (661 - 1 764 lbs) of waste per person per year (UN-HABITAT 2005). The growth of urban populations in most countries of the world

has led to the creation of "super cities"—urban areas where the original core city has become part of an agglomeration that takes in neighboring towns, new suburbs, dormitory towns, or shanty settlements. Increasingly, super cities are becoming powerful economic, social and cultural entities.

One positive aspect of urbanization is that urban dwellers tend to have fewer children and so help limit population growth. While badly run urban sectors can be serious problems for a country, a well-run urban sector can help ensure national prosperity. Well-planned cities can capitalize on high population densities to minimize resource use and energy consumption and CO<sub>2</sub> emissions—for example, by developing mass transit systems. Some cities are investing large sums in recycling and composting as part of ambitious waste-management programs. Many cities maintain large areas of productive agricultural land amid highways and high-rises (Harrison and Pearce 2001).





URBAN AREAS  
BANJUL, THE GAMBIA

The Gambia is a small—11 295 km<sup>2</sup> (4 361 square miles)—country in West Africa. It is surrounded by Senegal on all sides except on its coast. The capital city of Banjul lies at the end of a small peninsula that protrudes into the Atlantic Ocean.





*Credit: David McKee/UNEP/Gambia Tourist Support Website*  
The mangroves that lie on the northeastern edge of Banjul have largely escaped destruction, as urban development has mostly progressed westward. Increasing population and human encroachment remain a threat to the mangroves.

The country's population is increasing at a rate of about 4.2 per cent annually. For the past three decades, western Gambia has undergone considerable urban growth, particularly in Banjul and some of its neighboring cities, including Serekunda, Bakau, Sukuta, and Brikama. The population of the greater Banjul area, for example, more than tripled during this time. These two satellite images, taken in 1973 and 1999 respectively, show this urban

sprawl and its impact. Urban growth and the accompanying expansion of cropland around urban areas have led to a significant decline in woodland areas (dark green). The Abuko Nature Reserve, located in the center of the images, was once surrounded by woodlands. It now stands out as an isolated patch of green in an otherwise developed landscape.





Credit: Simon Tsuo/UNEP/NREF  
Market vendors selling fruits on a Beijing street.



# URBAN AREAS

## BEIJING, CHINA

Beijing, the capital city of the People's Republic of China, is located in the country's northeastern corner, in the transition zone between the Inner Mongolia Plateau and the North China Plain. It is a city that has undergone tremendous change and explosive urban growth, since the start of economic reforms in 1979.





*Credit: Law Chun Wah/UNEP/Topham*

Home to 13 million people, Beijing has experienced very rapid urban growth in the past several decades.

The left-hand satellite image shows Beijing in 1978, just prior to the reforms. The light blue-gray area in the center of the image is the urban landscape of the city. The hills to the west are covered with deciduous forest, which appears green. The agricultural lands that lie around the city appear as muted red, orange, and golden yellow, depending on the crop (rice, win-

ter wheat, or vegetables) and its stage of development. Beijing's explosive growth is very obvious in the 2000 image. The city has expanded from its original center in all directions. Prime agricultural lands that once lay outside the city are now suburbs dominated by institutional, industrial, and residential buildings. In 2000, Beijing's population was 13 million.





# URBAN AREAS

## BRASILIA, BRAZIL

Inaugurated on 21 April 1960, Brazil's new capital of Brasília began with a population of 140 000 and a master plan for carefully controlled growth and development that would limit the city to 500 000. Urban planner Lucio Costa and architect Oscar Niemeyer intended that every element—from the layout of the residential



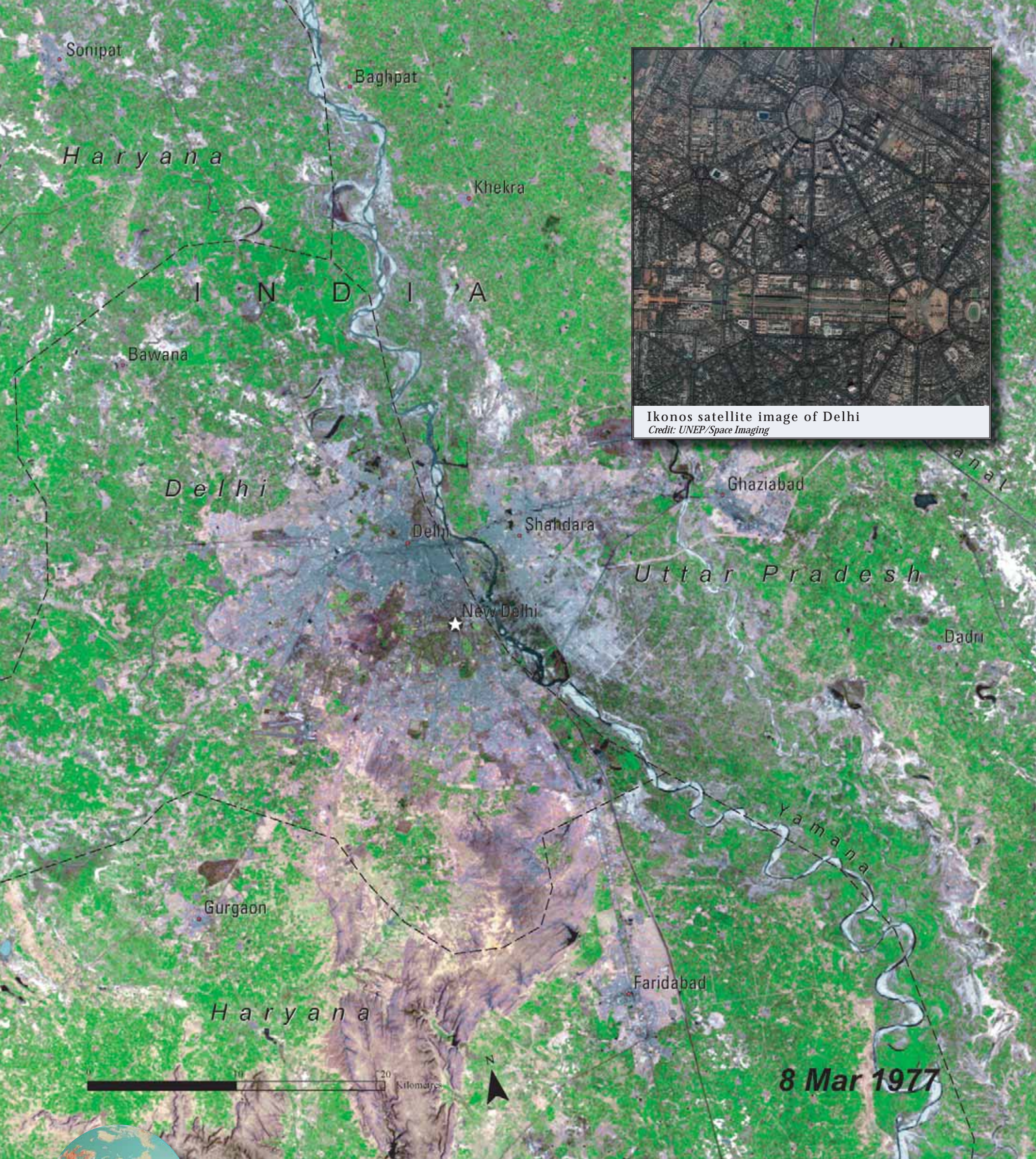


6 Aug 2001

and administrative districts to the symmetry of the buildings themselves—should act in harmony with the city’s overall design. This consisted of a bird-shaped core with residential areas situated between the encircling “arms” of Lake Paranoá. The city was a landmark in town planning and was recognized as a World Heritage site in 1987.

As these images reveal, unplanned urban developments arose at Brasília’s fringes resulting in a collection of urban “satellites” around the city. Several new reservoirs have been constructed since Brasília’s birth, but the National Park of Brasília stands out as a densely vegetated expanse of dark green that has remained relatively unchanged. In 1970, the population of Brasília and its satellites was roughly 500 000. The population now exceeds 2 000 000.





Ikonos satellite image of Delhi  
Credit: UNEP/Space Imaging

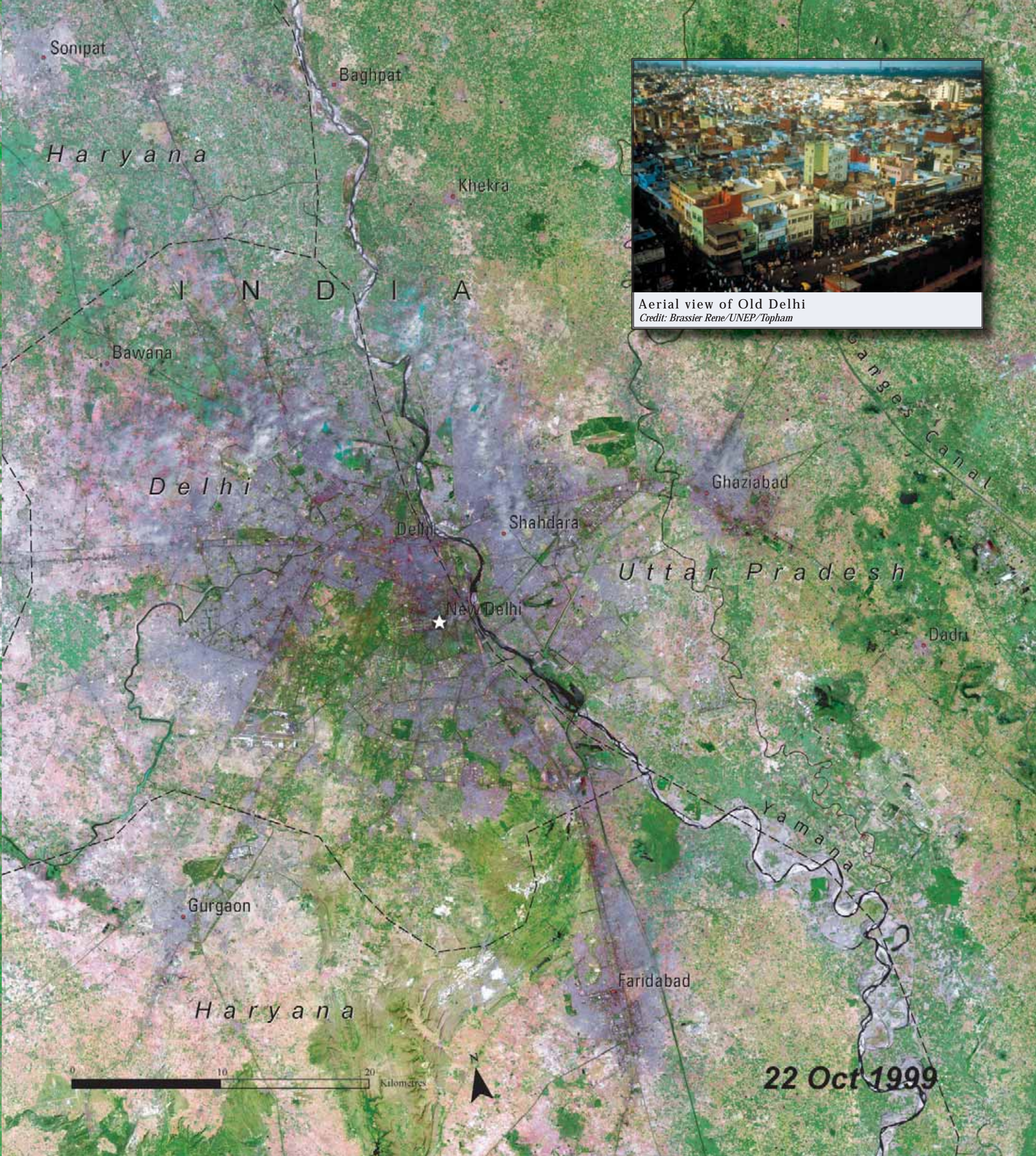


## URBAN AREAS

### DELHI, INDIA

India occupies only two per cent of the world's total landmass. Yet it is home to 15 per cent of the world's total population. Urban growth is characteristic of most Indian cities, with that of Delhi being especially dramatic, as these satellite images from 1977 and 1999 clearly show.





In 1975, Delhi had a population of 4.4 million people or 3.3 per cent of India's entire urban population. In 2000, the city had 12.4 million inhabitants, or more than 4.5 per cent of the country's urban population. Of the world's 30 largest urban agglomerations, Delhi ranked 24th in 1975 and tenth in 2000. By 2015, Delhi's population is expected to be 20.9 million.

In these images, urban areas appear in shades of gray and purple. Growth is especially noticeable in the suburbs and areas surrounding Delhi such as Ghaziabad, Faridabad, and Gurgaon. Rapid urbanization has placed tremendous pressure on land and water resources in and around Delhi.





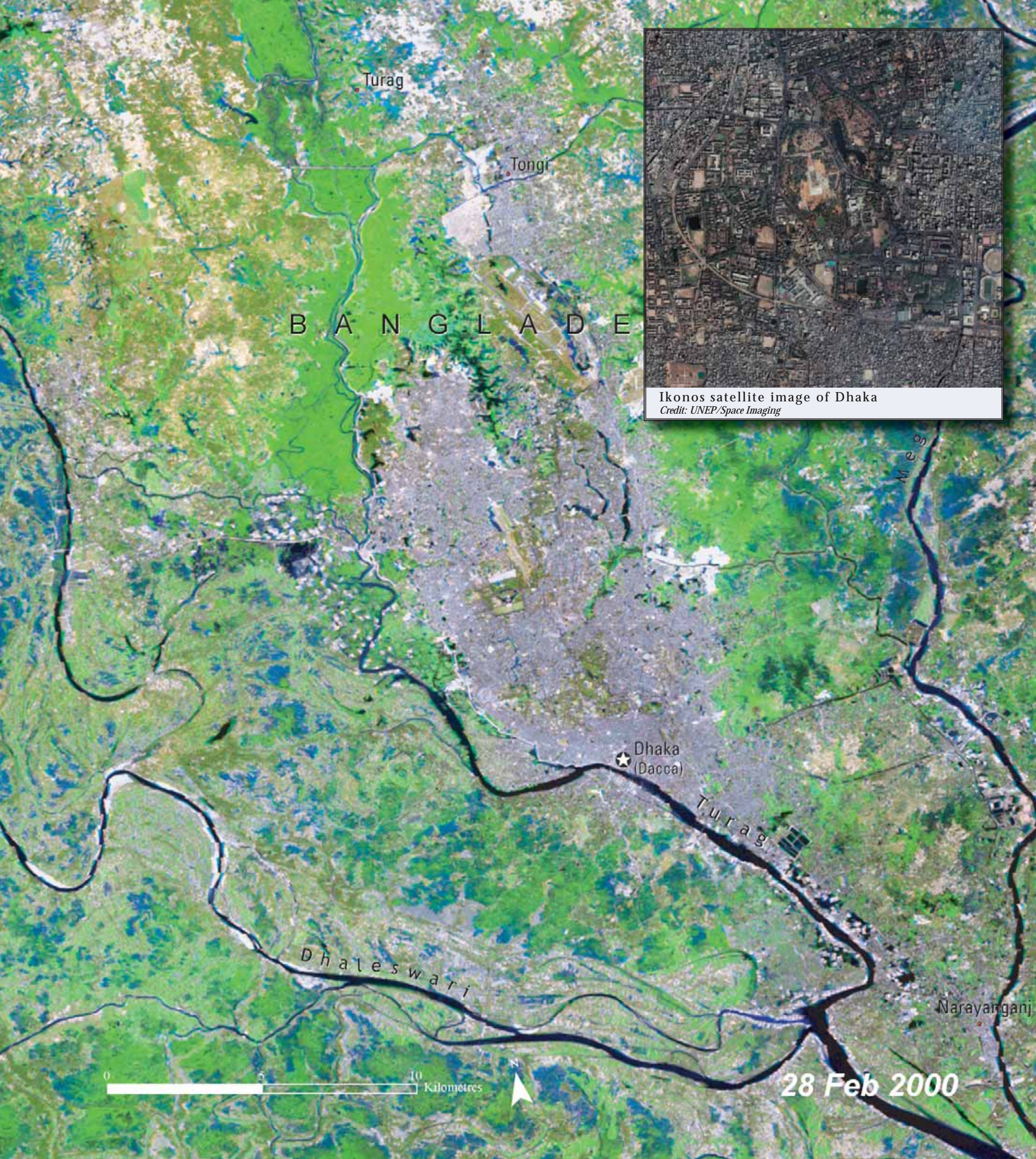
Vegetable vendor in Dhaka  
*Credit: Jim Welch/UNEP/NREL*



URBAN AREAS  
DHAKA, BANGLADESH

Dhaka, the capital of Bangladesh, has undergone phenomenal growth since the country gained independence in 1971. It has grown from a city of 2.5 million inhabitants to one with a population of more than ten million. This increase represents an average population





growth rate of about eight per cent annually. Dhaka is one of the poorest and most densely populated cities on the planet, with 6 545 people per square kilometre.

Following independence, urban areas expanded rapidly as they sought to become hubs of production and modernization. In the process, land use changed dramatically, as these images from 1977 and 2000 reveal. Dhaka is

visible in the central portion of each image along the Turag River. Green areas represent forests and agricultural lands. White spots are planned areas of infrastructure. Urban areas are light purple. The 2000 image shows how, over time, lowlands and agricultural lands have been converted to urban areas where Dhaka has expanded to the north.





*Credit: Lynn Betts/UNEP/USDA-NRCS*

A girl waters the yard in Clark County, Nevada.

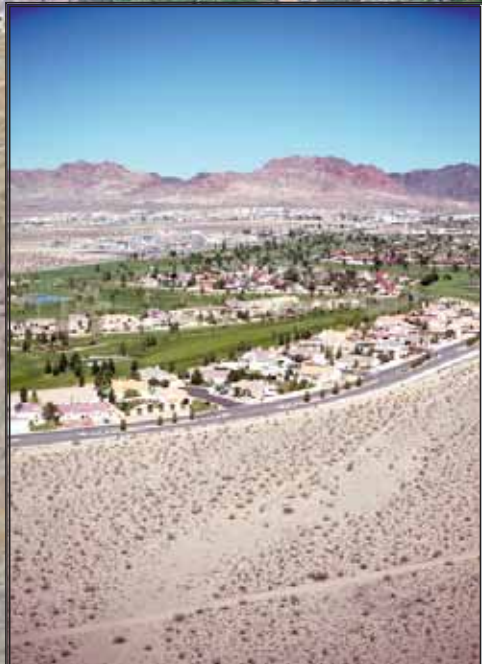
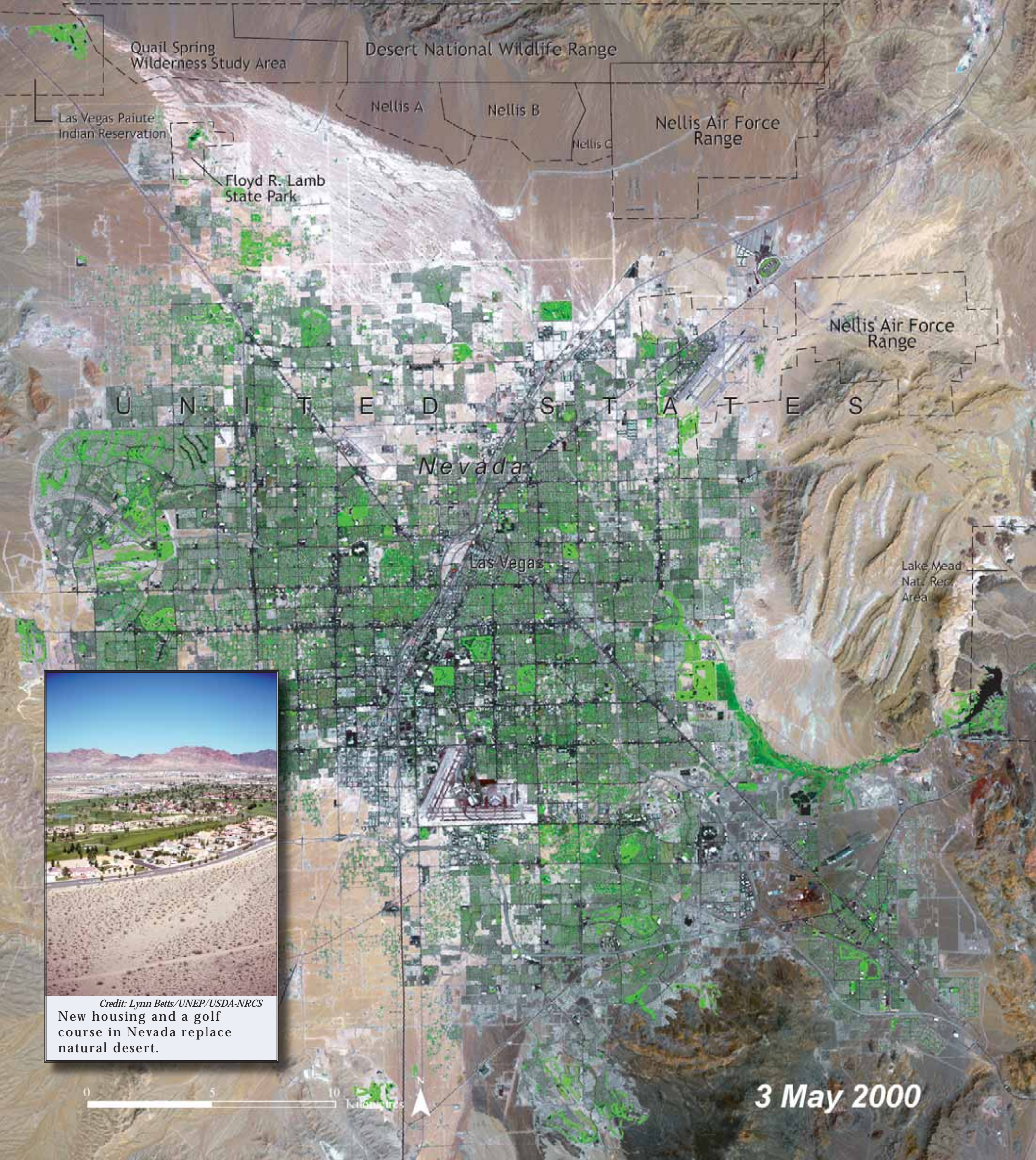


# URBAN AREAS

## LAS VEGAS, UNITED STATES

Las Vegas is the fastest growing metropolitan area in the United States. Its growth was fairly slow during the first half of the 20th century, but as the gaming and tourism industry blossomed the population increased more rapidly. In 1950, Las Vegas was home to 24 624 people. Today, the population of the Las Vegas Valley



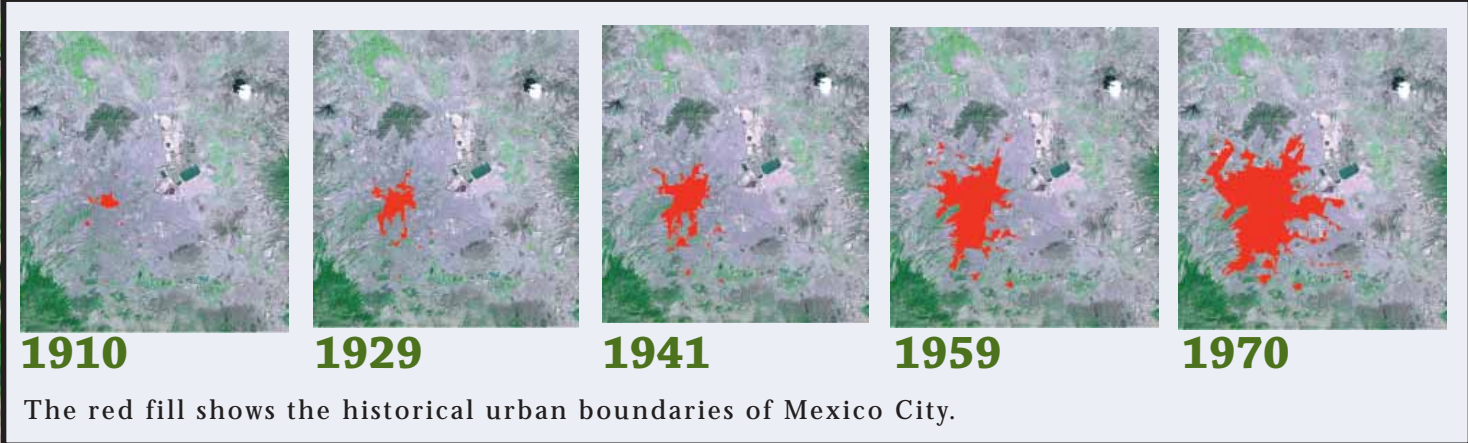
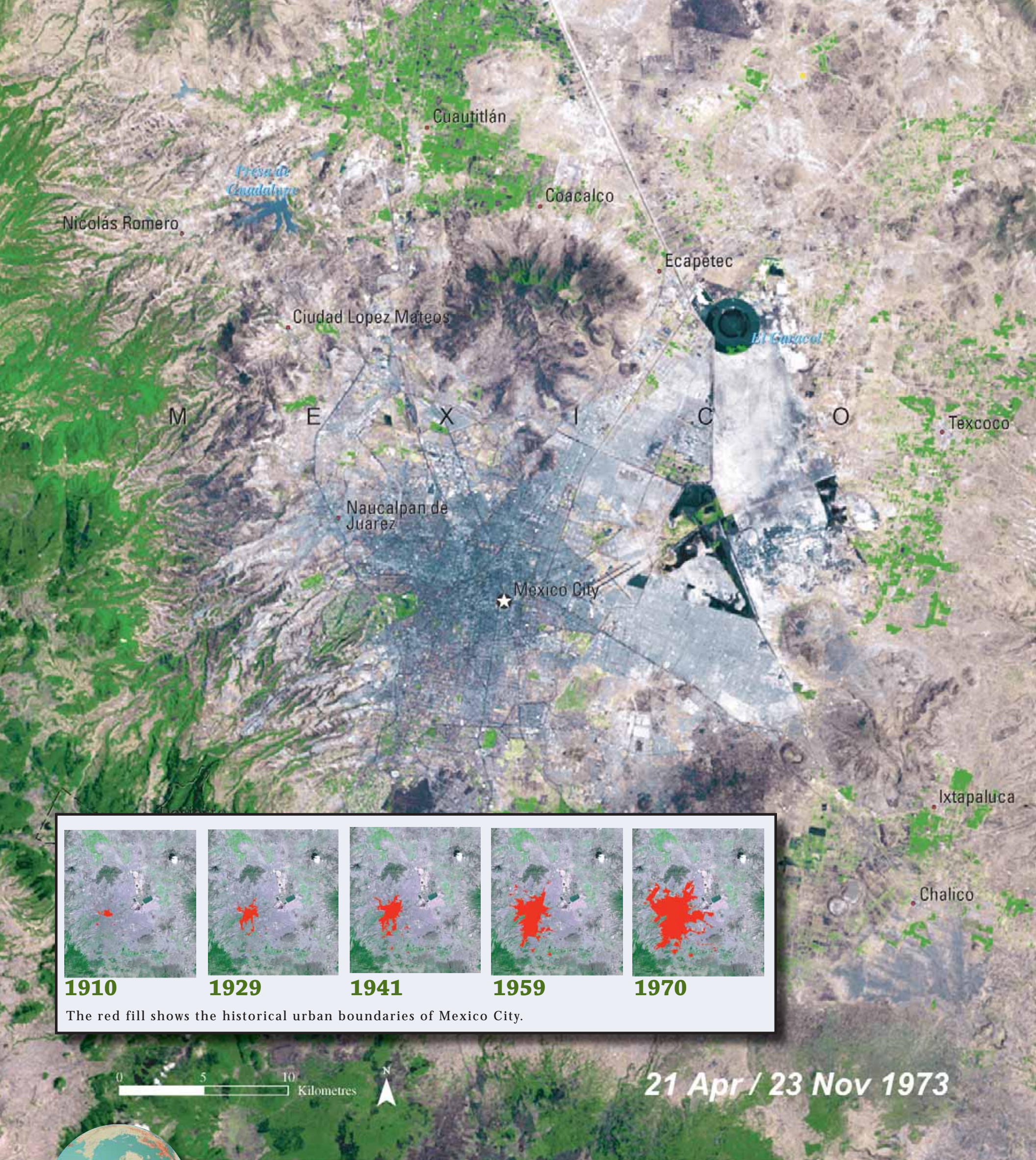


Credit: Lynn Betts/UNEP/USDA-NRCS  
New housing and a golf course in Nevada replace natural desert.

tops one million, not including the tourists. According to one estimate, it may double by 2015. This population growth has put a strain on water supplies. Satellite imagery of Las Vegas provides a dramatic illustration of the spatial patterns and rates of change resulting from the city's urban sprawl. Las Vegas is shown in the central portion of these images from 1973 and 2000. Note the profound modifications to the landscape—specifically the prolifera-

tion of asphalt and concrete roads and other infrastructure, along with the displacement of the few vegetated lands. By 2000, Las Vegas' growth had sprawled in every direction, with the greatest expansion to the northwest and southeast. As the city expanded, several new transportation networks emerged to serve the city's inhabitants.





0 5 10 Kilometres



21 Apr / 23 Nov 1973

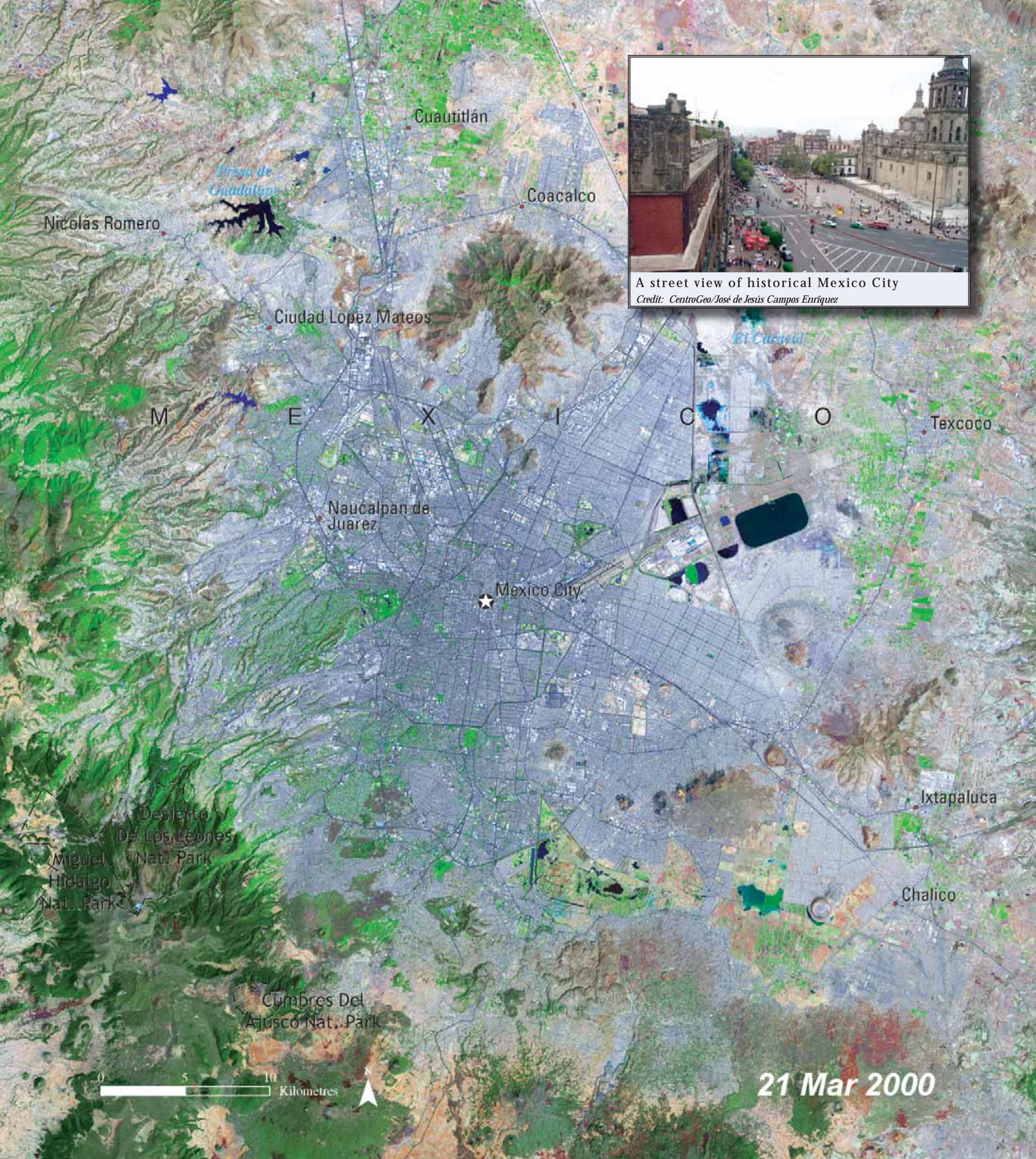


# URBAN AREAS

## MEXICO CITY, MEXICO

Mexico City is one of the fastest growing megalopolis cities in the world. These satellite images show the transformation Mexico City underwent between 1973 and 2000. Areas of urban infrastructure appear as

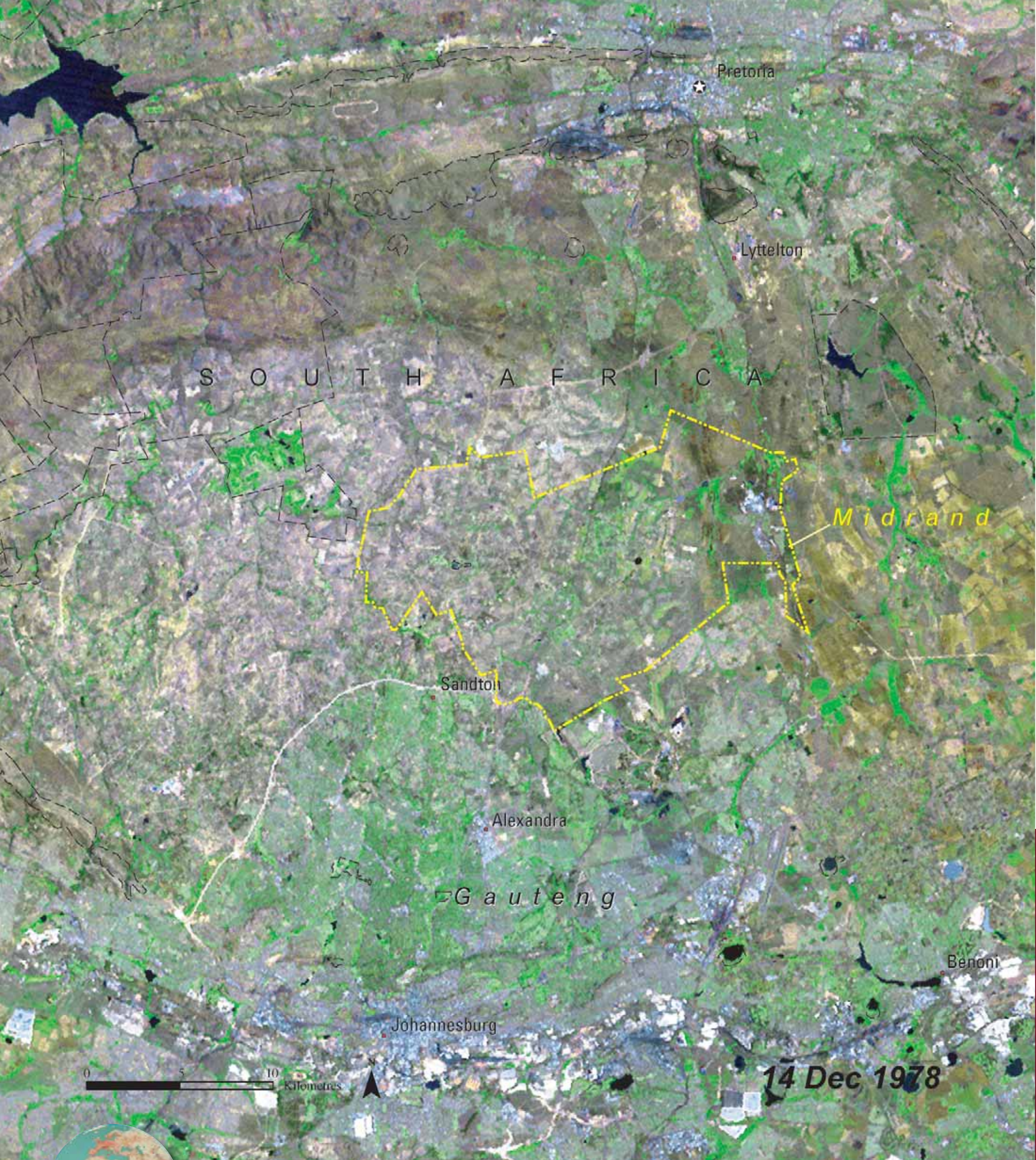




shades of purple while natural vegetation is shown in green. In 1973 Mexico City had a population of about 9 million. In the ensuing years, the city expanded into surrounding areas. The forests in the mountains west and south of the city suffered significant deforestation as the urban sprawl progressed.

By 1986, Mexico City's population had soared to 14 million. In 1999, Mexico City had a population of 17.9 million, making it the second largest metropolitan area in the world behind Tokyo, Japan. The Mexican megalopolis is expected to reach 20 million in the next few years.



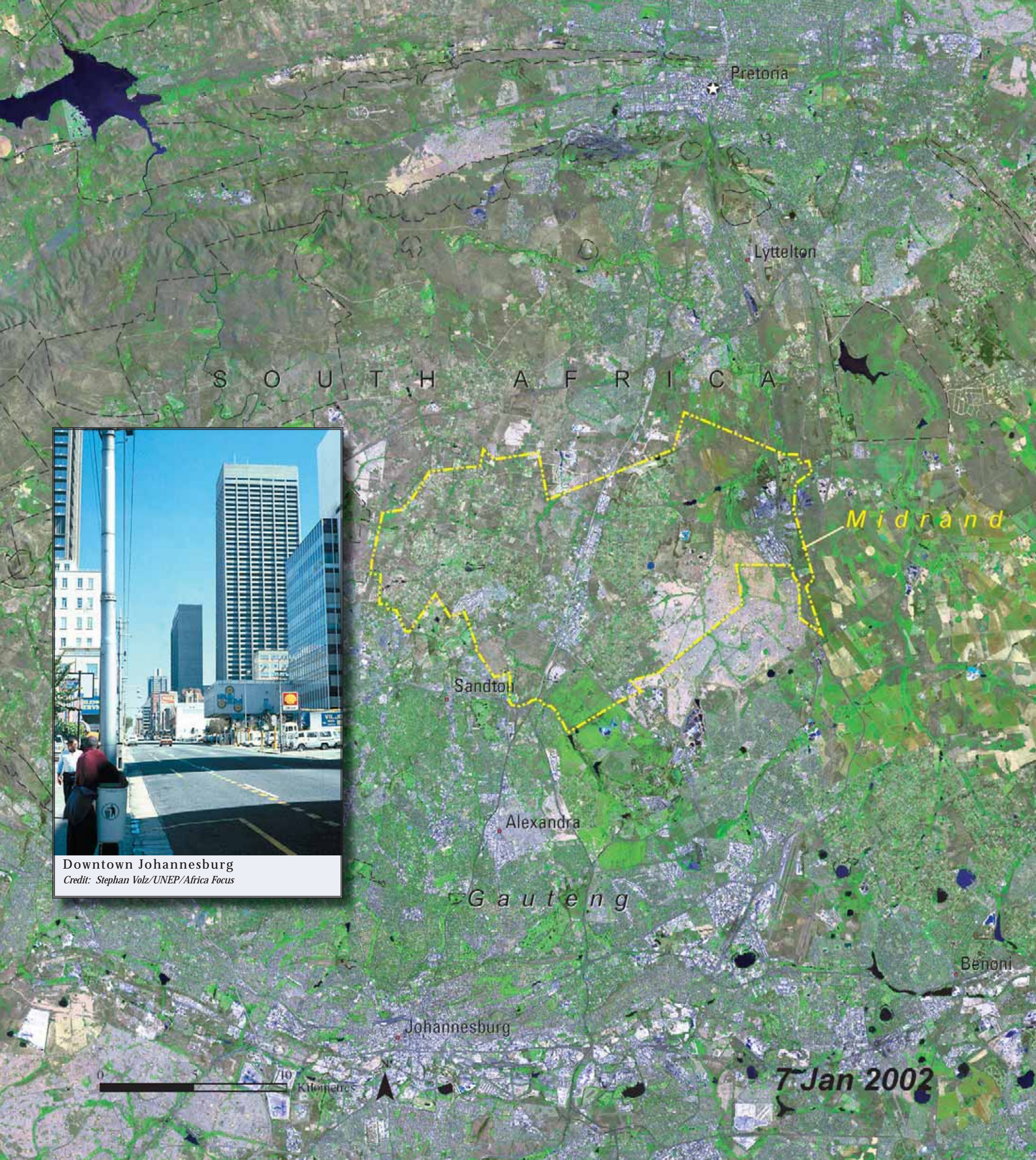


# URBAN AREAS

## MIDRAND, SOUTH AFRICA

Midrand is located approximately halfway between the major urban centers of Johannesburg and Pretoria in South Africa. The major highway that connects these two large cities dissects the city of Midrand into east





Downtown Johannesburg  
Credit: Stephan Volz/UNEP/Africa Focus

and west halves. Since 1978, the city has been rapidly transformed as a result of population growth, agriculture, mining, and industry.

In the 1978 image, the area surrounding Midrand consists largely of agricultural lands and rural residential zones, with some evidence of commercial development. The 2002 image reveals high-density urban development

throughout. Rapid growth of Midrand's economy is expected to continue. Current development trends and population growth rates indicate that if effective environmental management strategies are not adopted soon, significant deterioration in the quality of the environment can be expected.





Ikonos satellite image of the Kremlin

Credit: UNEP/Space Imaging



# URBAN AREAS

## MOSKVA, RUSSIA

Moskva—Russia’s capital city and its political and economic heart—sits on the far eastern end of Europe, roughly 1 300 km (815 miles) west of the Ural Mountains and the Asian continent. The Moskva (Moscow) River winds through the city, and the Kremlin, the seat



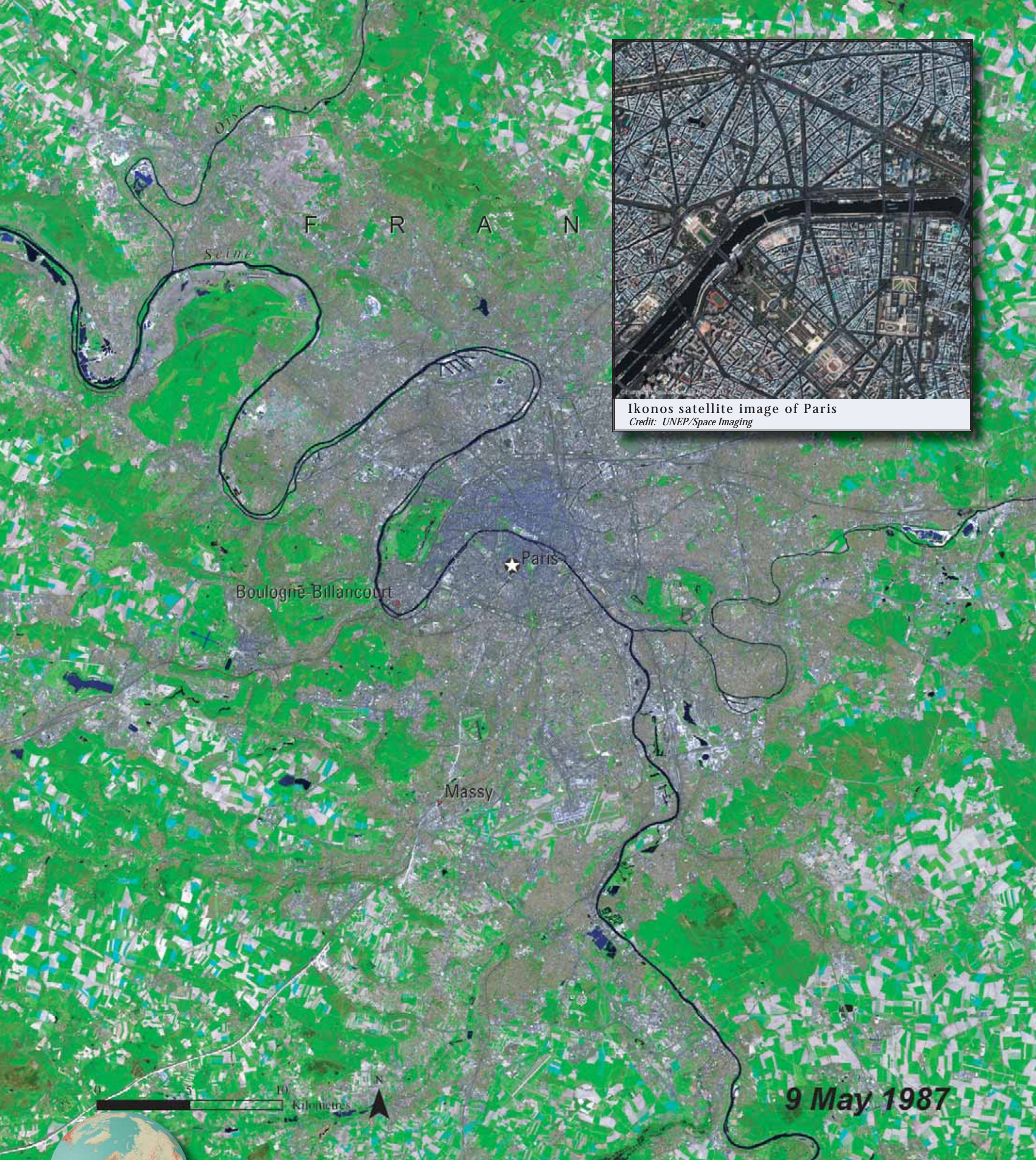


of the Russian government, lies at its center. With a population close to 9 million and an area of 1 035 km<sup>2</sup> (405 square miles), Moskva is believed to be the largest of all European cities.

These two images show the urban expansion Moskva experienced during the last 25 years of the 20th century. The blue-gray patches are urban areas.

The light green areas surrounding the city are farms while the brown areas are regions of sparse vegetation





Ikonos satellite image of Paris  
*Credit: UNEP/Space Imaging*

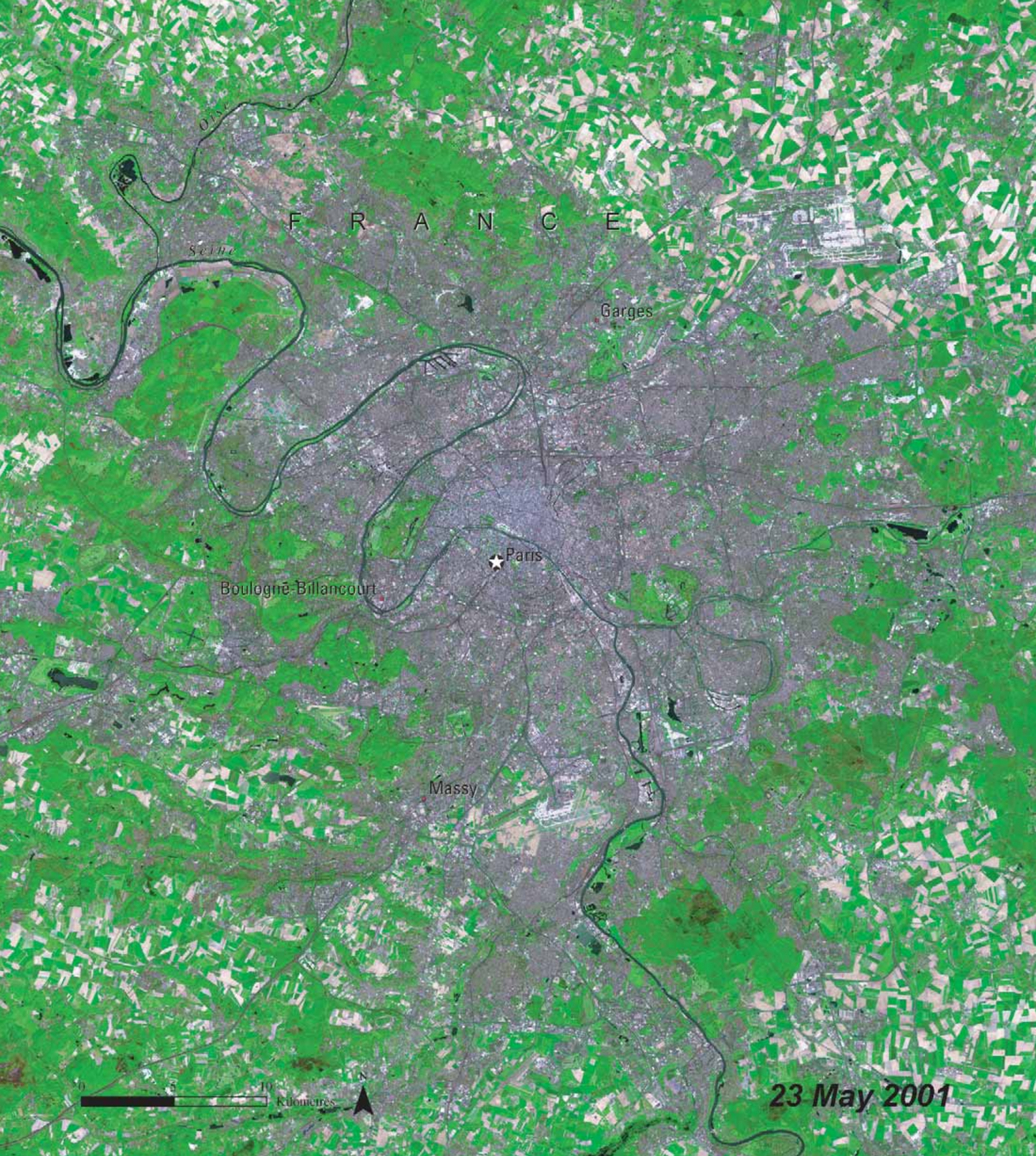


# URBAN AREAS

## PARIS, FRANCE

France is a large country with relatively few large metropolitan areas. Only 16 French towns and cities have populations of more than 150 000 people. Paris, the capital city of France, is the largest of these and home





to roughly 2 million inhabitants. The entire Paris metropolitan area, however, includes more than 11 million people.

Lying roughly 160 km (100 miles) southeast of the English Channel in northern France, Paris is considered by many to be one of the most beautiful cities in the world. In the images above, the Seine River can be seen winding

its way through the heart of the city. Urban areas appear gray and purple. The patchwork of green, brown, tan and yellow around the city is primarily farmland. Note how the city has expanded in the years between 1987 and 2001, reaching ever-further into the surrounding rural areas.



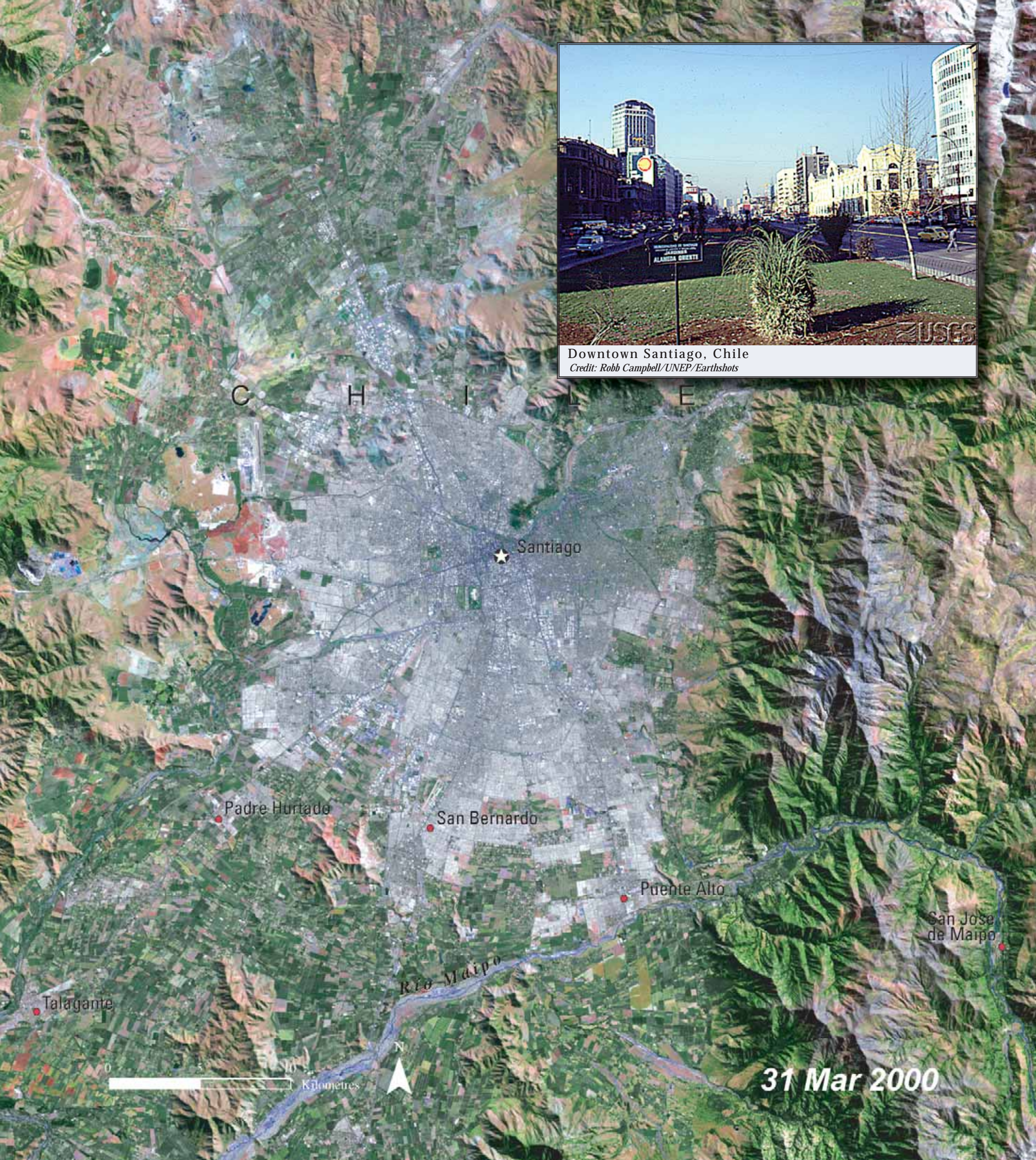


# URBAN AREAS

## SANTIAGO, CHILE

Santiago, the capital of Chile, is home to more than one-third of the country's total population of 15 million. Santiago's rapid growth is part of a national trend, but it is also a reflection of the large numbers of immigrants who are moving into the city.





Downtown Santiago, Chile  
Credit: Robb Campbell/UNEP/Earthshots

Santiago's population growth has led to a horizontal expansion of the city, principally towards the south and southeast. Chilean urban scholars speak of this expansion as the "urban stain" that continually exceeds and expands the limits of the Metropolitan Region of Santiago (MRS) while in-

corporating previously rural areas into it. Characteristics of Santiago's urban sprawl are haphazard growth, low-density housing, poor transportation, and air pollution. In the time frame illustrated by these images, Santiago's population has nearly doubled.





Sydney Opera House is one of the architectural wonders of the world, with its design and construction involving countless innovative design ideas and construction techniques.  
*Credit: DTCreations/UNEP/Morguefile*



# URBAN AREAS

## SYDNEY, AUSTRALIA

Australia is the sixth largest country in the world. It is roughly the same size as the conterminous United States and 50 per cent larger than Europe. Yet Australia has the lowest population density of any country in the world. With 4 million inhabitants, Sydney is





Australia's largest city. It is also the capital of New South Wales, the country's most densely populated state. Sydney is bounded by the Pacific Ocean to the east, national parks and deep-water inlets to the north and south, and the spectacular Blue Mountains far to the west. These natural boundaries have influenced Sydney's urban growth patterns. Over the past several decades,

the city's expansion has been largely westward toward the Blue Mountains, as can be seen in these two satellite images. As suburbs sprawl into bushland, they become vulnerable to summer bush fires.





In this image from 1989, urban areas have replaced agricultural zones along the coast. The results of center pivot irrigation can be seen in the center of the image, where dark green areas show progress from a project called the “Great Man-Made River,” which delivers water from underground aquifers in central and southern Libya to the coastal regions.



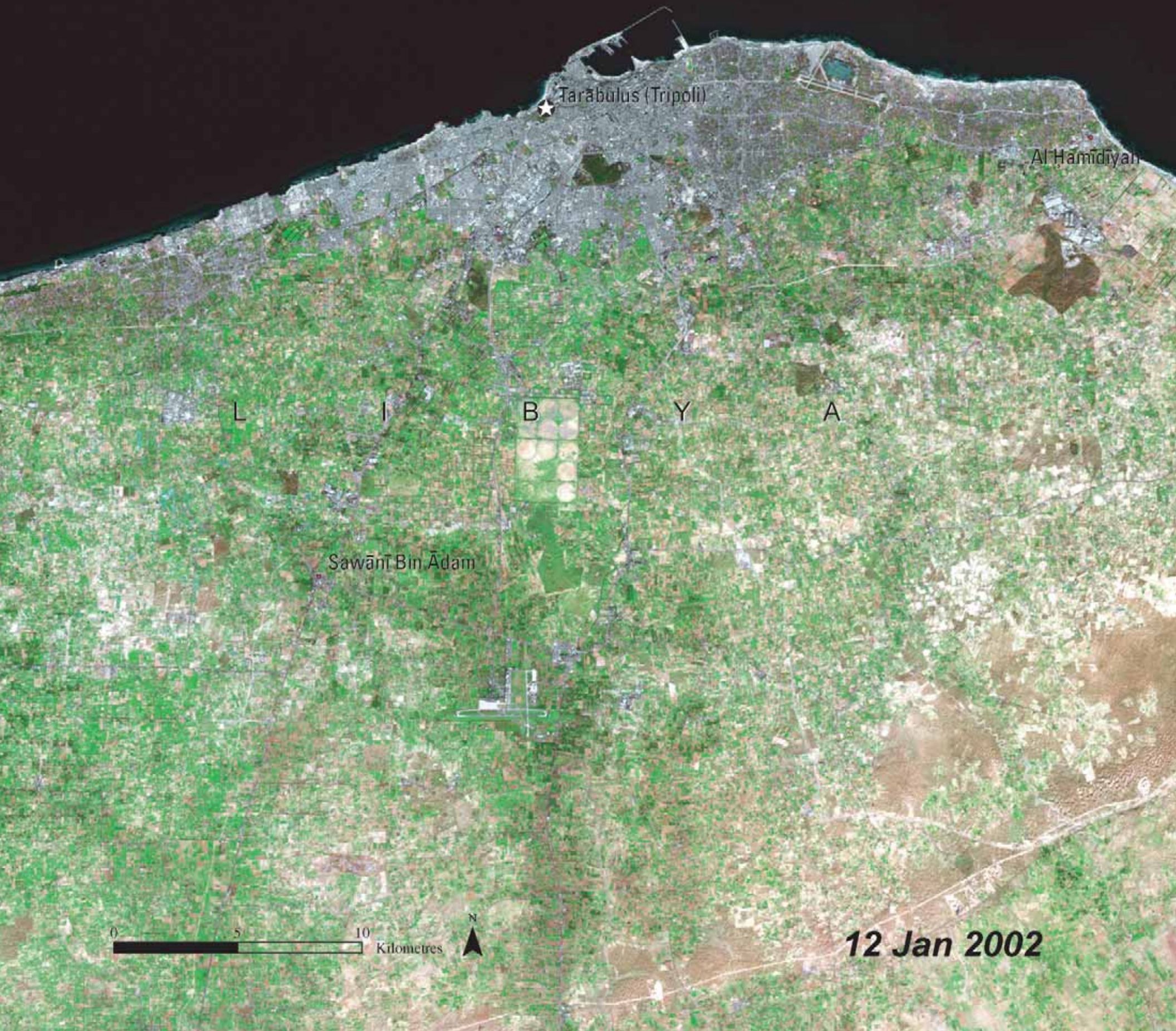
# URBAN AREAS

## TRIPOLI, LIBYA

Tripoli, the capital city of Libya, is located on the country’s Mediterranean coast along a narrow band of fertile lowlands that quickly give way to a vast interior of arid, rocky plains and seas of sand. Tripoli has undergone steady urban growth over the past thirty years.



## *Mediterranean Sea*



These three satellite images, from 1976, 1989, and 2002, document some of the major changes.

Urban areas appear as shades of grey. Darker patches south of the city, visible in both the 1976 and 1989 images, represent grasslands that have been converted to agricultural fields. Bright green areas are planted croplands. In

the 2002 image, urban expansion is especially notable. The irregular brown patch in the upper far right of this image, south of Al Hamidiyan, is perhaps the last remaining vestige of natural vegetation in the Tripoli region.